

WHAT IS CLAIMED IS:

1. A paperboard material useful in the manufacture of paperboard containers such as paper cups comprising a paperboard web including wood fibers and expanded microspheres dispersed within the fibers and having an apparent density of from about 6.0 to about 10 lb/3MSF/mil and a caliper of from 24 to about 35 mil with an internal bond of at least about  $80 \times 10^{-3}$  ft-lbf.

2. The paperboard material of claim 1 wherein the density of the web is at least about 6.5 lb/3MSF/mil and the caliper of the web is at least about 28 mil.

3. The paperboard material of claim 2 wherein the average bond of the web is at least about  $100 \times 10^{-3}$  ft-lbf.

4. The paperboard of claim 1 wherein the average internal bond of the web is at least about  $100 \times 10^{-3}$  ft-lbf.

5. The paperboard of claim 1 wherein the average internal bond of the web is at least about  $80 \times 10^{-3}$  ft-lbf.

6. The paperboard material of claim 1 further comprising a barrier coating on at least one of the surfaces of the web.

7. The paperboard material of claim 6 wherein the barrier coating is present only on a surface of the web to be placed interiorly of a cup.

8. The paperboard material of claim 6 wherein the barrier coating has an average thickness of from about 0.5 to about 3.5 mil.

9. The paperboard material of claim 6 wherein the barrier coating comprises a coating material selected from the group consisting of polyethylene, EVOH, and polyethylene terephthalate having an average thickness ranging from about 0.5 to about 3.5 mil.

10. The paperboard material of claim 6 wherein the barrier coating comprises a low density polyethylene having an average thickness of from about 1 to about 3 mil.

11. The paperboard material of claim 6 wherein a barrier coating is present on both surfaces of the web.

12. The paperboard material of claim 1 wherein the web has a Sheffield smoothness of at least about 300 SU.

13. The paperboard material of claim 1 wherein the web has a surface with a Sheffield smoothness of at least about 300 SU and the material contains printing directly on the surface.

14. The paperboard material of claim 1 wherein the web has a surface with a Sheffield smoothness of at least about 300 SU and a PPS10 smoothness of about 6.5 microns or less and carries printing on the surface.

15. The paperboard material of claim 1 wherein the cellulosic fibers in the web comprise from about 20 to about 40% by weight dry basis softwood fibers and from about 60 to about 80% by weight dry basis hardwood fibers.

16. The paperboard material of claim 1 wherein the expanded microspheres in the web comprise synthetic polymeric microspheres and comprise from about 0.25 to about 10 wt.% of the total weight of the web on a dry basis.

17. The paperboard material of claim 1 wherein the expanded microspheres in the web comprise synthetic polymeric microspheres and comprise from about 5 to about 7 wt.% of the total weight of the web on a dry basis.

18. A paperboard material useful in the manufacture of insulated containers such as cups which comprises a paperboard web including wood fiber and from about 5 to about 10 wt.% dry basis expanded synthetic polymer microspheres based on the total weight of the web dispersed within the fibers, an apparent density of from about 6.0 to about 10 lb/3MSF/mil, a caliper of from about 24 to about 35 mil, an average internal bond of at least about  $80 \times 10^{-3}$  ft-lbf, a Sheffield smoothness of about 300 SU or greater, and a barrier coating having a thickness of from about 0.5 to about 3.5 mil on at least one surface of the web.

19. The paperboard material of claim 16 further comprising printing applied directly to at least one surface of the web.

20. An assembled paper container which comprises a sidewall and a bottom sealably joined together wherein the sidewall is provided by a paperboard material which comprises a paperboard web including wood fiber and from about 5 to about 10 wt.% dry basis expanded synthetic polymer microspheres based on the total weight of the web dispersed within the fibers, an apparent density of from about 6.0 to about 10 lb/3MSF/mil, a caliper of from about 24 to about 35 mil, an average internal bond of at least about  $80 \times 10^{-3}$  ft-lbf, a Sheffield smoothness of

about 300 SU or greater, and a barrier coating having a thickness of from about 0.5 to about 3.5 mil on at least one surface of the web.

21. An assembled paper cup which comprises a sidewall and a bottom sealably joined together wherein the sidewall is provided by a paperboard material which comprises a paperboard web including wood fiber and from about 5 to about 10 wt.% dry basis expanded synthetic polymer microspheres based on the total weight of the web dispersed within the fibers, an apparent density of from about 6.0 to about 10 lb/3MSF/mil, a caliper of from about 24 to about 35 mil, an average internal bond of at least about  $80 \times 10^{-3}$  ft-lbf, a Sheffield smoothness of about 300 SU or greater, and a barrier coating having a thickness of from about 0.5 to about 3.5 mil on at least one surface of the web.

22. A method for making a low density paperboard material suitable for use in producing an insulated container such as a cup comprising providing a papermaking furnish containing cellulosic fibers and from about 0.25 to about 10 % by weight dry basis expandable microspheres, forming a paperboard web from the papermaking furnish, drying the web, and calendaring the web to a caliper of from about 24 to about 35 mils and a density ranging from about 200 to about 220 lb/3MSF.

23. The method of claim 22 wherein the density of the web is at least about 6.5 lb/3MSF/mil and the caliper of the web is at least about 28 mil.

24. The method of claim 23 wherein the internal bond of the web is at least about  $100 \times 10^{-3}$  ft-lbf.

25. The method of claim 22 wherein the internal bond of the web is at least about  $100 \times 10^{-3}$  ft-lbf.

26. The method of claim 22 wherein the internal bond of the web is at least about  $80 \times 10^{-3}$  ft-lbf.

27. The method of claim 22 further comprising applying a barrier coating on at least one of the surfaces of the calendered web.

28. The method of claim 27 wherein the barrier coating is present only on a surface of the web to be placed interiorly of a container.

29. The method of claim 27 wherein the barrier coating has an average thickness of from about 0.5 to about 3.5 mil.

30. The method of claim 27 wherein the barrier coating comprises a coating material selected from the group consisting of polyethylene, EVOH, and polyethylene terephthalate having an average thickness ranging from about 0.5 to about 3.5 mil.

31. The method of claim 30 wherein the barrier coating comprises a low density polyethylene having an average thickness of from about 1 to about 3 mil.

32. The method of claim 27 wherein a barrier coating is present on both surfaces of the web.

33. The method of claim 22 wherein the web exhibits a Sheffield smoothness of at least about 300 SU.

34. The method of claim 22 wherein the web is calendered so as to exhibit a Sheffield smoothness of at least about 300 SU and the method further comprises printing directly on the surface.

35. The method of claim 22 further comprising printing directly on a surface of the web to be positioned on the exterior of the container and wherein the surface that carries the printing exhibits a Sheffield smoothness of at least about 300 SU and a PPS10 smoothness of about 6.5 microns or less.

36. The method of claim 22 wherein the furnish comprises from about 5 to about 7 wt.% dry basis expandable microspheres.

37. A method for making an insulated paperboard-based cup having a sidewall and a bottom which comprises providing a paperboard material comprising a paperboard web including from about 0.25 to about 10 % by weight dry basis of expanded polymeric microspheres, a caliper of from about 24 to about 35 mils, an apparent density of from about 6.5 to about 10 lb/3MSF/mil, an internal bond of at least about  $80 \times 10^{-3}$  ft-lbf, and a Sheffield smoothness of at least about 300 SU, and a barrier coating on at least one surface of the web having a thickness of from about 0.5 to about 3.5 mil, forming at least the sidewall of the cup from the web with a surface of the web containing the barrier coating facing interiorly of the cup and the other surface of the web facing exteriorly of the cup, and sealably joining the sidewall to the bottom.

38. The method of claim 37 wherein the web has barrier coatings on both of its surfaces facing interiorly and exteriorly of the cup.

39. The method of claim 38, wherein the web has printing on the barrier coating on the surface positioned exteriorly of the cup.

40. The method of claim 37, wherein the web has a barrier coating only on its surface facing interiorly of the cup and the web has printing on its surface facing exteriorly of the cup.